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April 17, 2012

VIA ELECTRONIC FILING

Marlene H. Dortch, Secretary
 Federal Communications Commission
 The Portals
 445 12th Street, S.W.
 Washington, DC 20554

Re: Notice of Ex Parte Meeting – WT Docket No. 10-4

Dear Ms. Dortch:

On April 13, 2012, Michiel Lotter, Vice President Engineering at Nextivity, Inc. (“Nextivity”) and Catherine Wang of Bingham McCutchen LLP, outside counsel to Nextivity, met with Joyce Jones, John Leibovitz, Moslem Sawez, and Becky Schwartz from the Wireless Telecommunications Bureau and Rashmi Doshi, Ira Keltz, and Bruce Romano of the Office of Engineering & Technology. (Ms. Schwartz and Messrs. Doshi and Keltz participated by telephone.)

Nextivity, a U.S.-based leader in the development of advanced booster technology, expressed strong support for the Commission’s efforts to develop rules that make available to consumers an array of well-designed boosters while ensuring unconditional carrier network protection. With this overarching goal in mind, we discussed specific changes that Nextivity believes should be made to the specific rule language regarding limits on noise, gain and out of band emission.¹

By way of background, we outlined Nextivity’s very significant capital investment in research and development and commitment to developing high quality, innovative operator-specific band select booster technology (the “Cel-Fi Consumer Booster”). Nextivity’s equipment incorporates advanced technology to provide superlative expanded coverage to consumers using 3G and beyond cellular networks (i.e., UMTS, CDMA and LTE), all of which employ fast power control. Among other innovations, the ability of Nextivity’s technology to adjust booster gain in real-time to adapt to local environments delivers higher quality service to consumers with no risk of harmful interference to carrier networks.

¹ Letter from Verizon Wireless and Wilson Electronics, Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission, WT docket No. 10-4, filed March 14, 2012 (proposing technical requirements for noise limits, booster gain limits and out of band emission limits at proposed Section 20.16.(f)(i), (iii), and (v)).

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We also discussed Nextivity's primary business model which is to offer technology directly to operators who subject the equipment to stringent technical evaluation before providing the booster equipment directly to subscribers (typically at no cost to the consumer). While not every operator could or consumer would choose the Nextivity booster product, such technology has been extremely well-received by operators and consumers of 3G and 4G networks.

Nextivity estimates that for carrier customers, the return on investment ("ROI") for a consumer booster like the Nextivity product is in excess of \$2 for every \$1 spent. This is mainly due to the fact that each Cel-Fi system deployed benefits on average more than two subscribers. Our customers tell us that for every Cel-Fi system that is provided to a household, approximately 20% new broadband data connections are made. Especially in areas where fixed line infrastructure is lacking, such as in rural areas, this increase is significant. In short, the Cel-Fi booster technology is a very effective means of enabling greater access to broadband data services for consumers and expanded wireless network penetration for carriers

Nextivity believes that the above-mentioned benefits of the Nextivity type of booster are mainly due to the ability of such systems to provide good cellular coverage across an entire house thus benefiting all the residents in a home. This coverage is in strong contrast to the class of consumer boosters that only provide one or, at best, a few rooms of coverage in which case the ROI is significantly lower.

In Nextivity's experience, the impact of a high performing booster, from the end user perspective, is both highly positive and immediate. As an example, below is a typical end-user comment on the experience with Cel-Fi:

- *"I have been with T-Mobile for about 12 years. I have two lines and none with any other cellular carrier. Prior to receiving the Signal Booster my service was weak, at best. I had to stay in one place (on my staircase) in order to get consistent coverage, and even that was only a couple of bars.*
- *Since installing the Signal Booster, the signal strength is finally what I expected to have without any assistance. I have consistently improved coverage and **data capabilities**. The installation process was easy. It comes nearly ready to use. It took me longer to read the instruction pamphlet than to actually install the device.*
- *I would recommend the T-Mobile Signal Booster to anyone who has the type of coverage I was experiencing in my home over the last five years. I am still getting used to having the ability to use my cell phone at home!"*
- **T-Mobile Customer, Austin TX.**

Today, Nextivity's Cel-Fi booster has been deployed by 10 of the top 20 carriers in the world, as well as two wireless providers (including T-Mobile) in the United States. This information is included in detail in the slide deck attached as Attachment A that was presented at our meeting.

Nextivity strongly urges the Commission to adopt rules that enable consumers and operators to choose the products that provide the best price/performance trade-offs for that buyer's circumstances. The rule language currently proposed by Verizon and Wilson incorporates technical restrictions appropriate for a market made up of first-generation equipment. However, today there are three generations of product evolution available in the market:

- First generation, broad-band, bi-directional amplifiers that amplify the whole cellular band and is a relatively "dumb" device. Generally, these systems are only able to provide expanded coverage in one room in a house.
- Second generation, band select repeaters (some incorporating Interference Cancellation Techniques). These system typically can provide two rooms with expanded coverage.
- Third generation, Smart Repeaters from vendors such as Nextivity. Smart Repeaters are carrier grade, mass deployable, consumer installable devices that are unconditionally network safe and offer larger coverage footprints. This category of Consumer Booster has been recognized by other regulatory bodies, such as OFCOM in the UK. These systems typically provide whole-house coverage.

The rule language under consideration with respect to limits on noise, gain and out of band emissions ("OOBE") would adequately ensure that *first-generation* wideband boosters could operate without harm to the networks but would unnecessarily stifle the implementation of advanced, band-select boosters -- *second and third generation boosters* -- thus denying consumers the significant expanded coverage and cost benefits of next generation boosters, without any concomitant benefit of increased network protection (third generation boosters, such as Nextivity's booster, are inherently designed to protect operator networks from interference). Such a rule would significantly impair Nextivity's substantial capital investment in developing advanced innovative booster technology.

Nextivity urged the Commission staff to consider amending the language under consideration with respect to noise limits, gain and OOBE so that the rules accommodate different generations of band-select booster equipment *as well as* wideband equipment, rather than artificially freezing technology development (and the availability of significant consumer and carrier benefits) at the first

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generation stage and imposing unnecessary costs on consumers. The proposed language would incorporate alternative technical requirements for band-select systems in addition to requirements tailored to wideband systems so that consumers (and manufacturers) would have the full choice of technologies and price points in making equipment purchasing and manufacturing decisions. Nextivity's specific proposed language is set forth in Attachment B which was provided to Commission staff in our meeting.

Without the proposed rule change, the impact of the Cel-Fi system, and systems like it, on the coverage throughout the home would be significantly reduced and consequently impact the Return on Investment our customers are currently seeing for Cel-Fi devices. Adoption of the Nextivity proposed language will enable multiple booster systems to co-exist, avoid barriers to further technology innovations, ensure a robust competitive market for booster technology, avoid harm to carrier networks, and make available to consumers the full cost and wireless service benefits of existing and future innovations.

Should any additional information be required with respect to this *ex parte* notice, please do not hesitate to contact the undersigned.

Very truly yours,

/s/

Catherine Wang

Attachments
cc (by email): FCC Representatives

ATTACHMENT A

Cel-Fi Consumer Booster

Presented to FCC on 13 April 2012

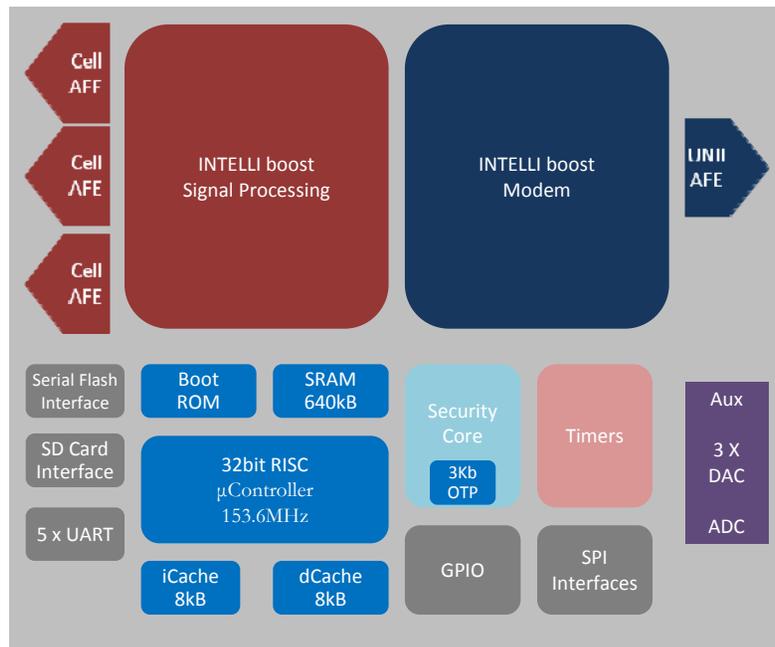
Nextivity Inc.

- Founded in 2006, Headquartered in San Diego, California
- Designer and developer of carrier–grade, mass deployable, operator specific, band select, indoor cellular coverage systems and all underlying software and silicon technology
- Primary business model is to sell directly to operators who put the product through a very stringent technology evaluation before deploying it on their networks
- Offices in San Diego, CA (center for all R&D); Swindon, UK; Stuttgart, Germany; Dusseldorf, Germany; Barcelona, Spain; Madrid, Spain
- World-wide distribution network including multiple partners, such as Netgear (NASDAQ: NTGR)
- Key technology partners include **T-Mobile** with whom we are working to define appropriate and acceptable proposals for the NPRM process

Window Unit And Coverage Unit



Cel-Fi: Powered by the IntelliBoost Processor Family



IntelliBoost II (“Falcon”)

<i>Technology</i>	: Toshiba 65nm
<i>Package</i>	: F-BGA 362 11x11mm 0.5mm pitch
<i>Power consumption</i>	: 1.5W
<i>Standards supported</i>	: WCDMA/HSPA Rel 8

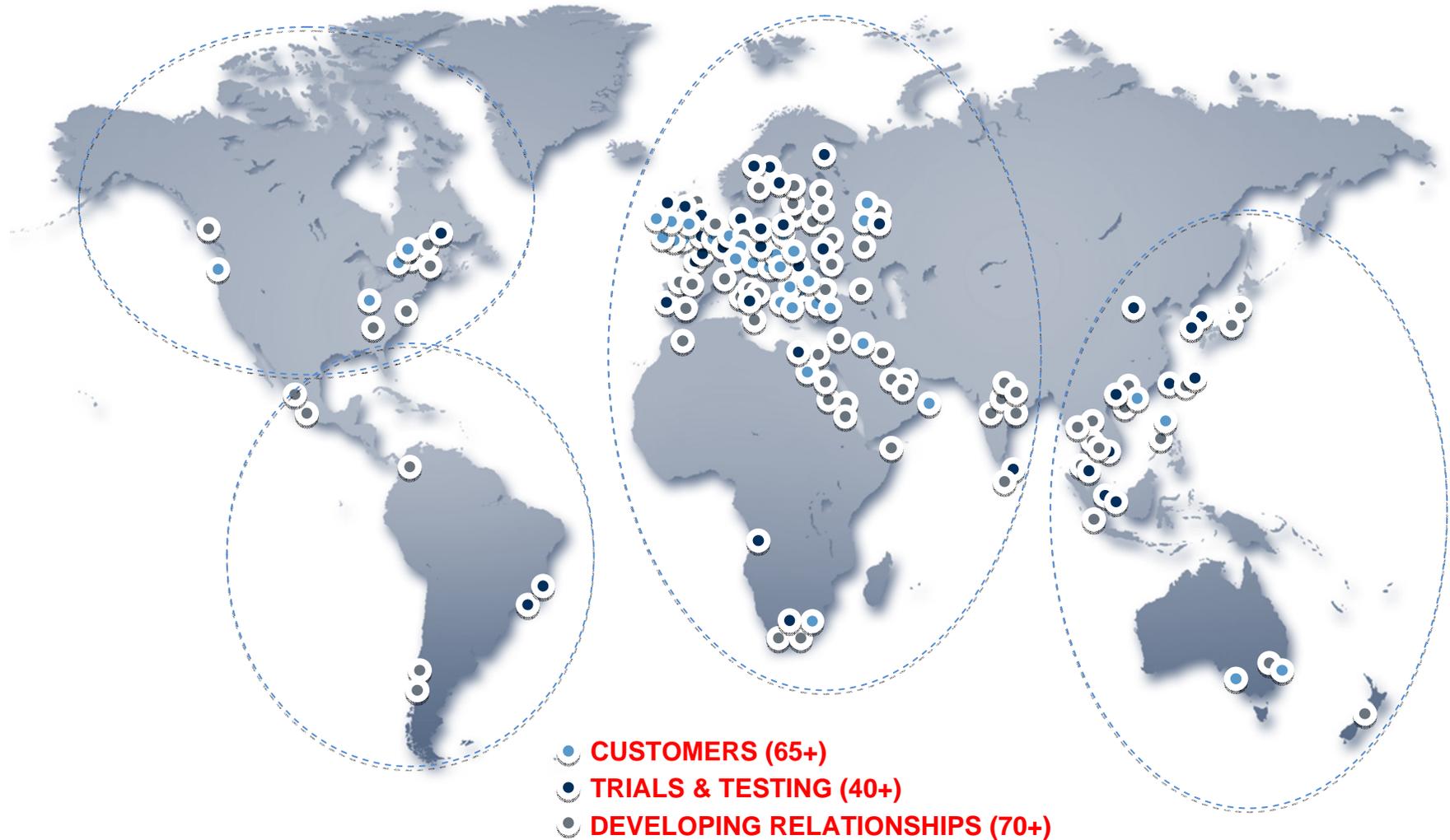
Cel-Fi is powered by patented technology embodied in a family of custom design ASIC’s to enable a new class of product performance and price.

Key Cel-Fi Features that impact NPRM process:

- Operator specific
 - PLMN-ID of operator is automatically verified prior to boosting operator’s signal
- Band select
 - Can boost 1, 2 or 3 5MHz UMTS carriers. Very sharp filtering possible with IntelliBoost processor
- Unconditionally Network safe
 - Adjust booster gain in real-time to adapt to environment
 - Mute uplink in less than 1 sec when no uplink is present
 - Extensive anti-oscillation protection guaranteeing unconditional stability

Worldwide Customer Base

■ Nextivity boasts a truly global base of demand from the world's top operators in virtually every continent



World-wide Operator Approvals

Rank	Operator	M's Subs
1	China Mobile	650
● 2	Vodafone	440
● 3	Telenor	326
● 4	Singtel	300
5	American Movil	236
● 6	Telefonica	232
7	Airtel	232
● 8	Orange	226
● 9	Beeline	200
○ 10	China Unicom	200
○ 11	Axiata	160
12	TeliaSonera	160
● 13	Saudi Telecom	140
● 14	MTN	140
○ 15	Etisalat	135
16	Reliance	135
● 17	T-Mobile	130
18	Verizon	110
● 19	MTS	105
20	AT&T	100



● - Current Customer (product fully type approved) ○ - In Trials – approval pending

Nextivity's Position on the NPRM

- Nextivity supports rules for the deployment of well designed Consumer Boosters
- Consumer Boosters benefit end-users
 - A clear set of guidelines that enables innovation on the part of product developers will serve the public interest
 - Rules should enable improved user mobile experience while ensuring unconditional carrier protection for deployment in mobile networks
- Nextivity has raised a significant amount of Venture Capital to support the R&D effort to bring such products to market

Nextivity's Position on the NPRM

- Nextivity, and our partner T-Mobile, supports rules that reflect the advanced technology development that has taken place over the past 5 years in this area
- Current rule language under consideration assumes booster equipment does *not take* advantage of advanced technology
 - Unintended consequences: penalizes advanced developments and inhibits further innovation
- Not all product vendors have innovated at the same rate and therefore rules must allow different product concepts to **co-exist** in the marketplace. Rules must not inhibit innovation!
- Consumers and operators should be able to choose the products that provide the best price/performance trade-offs

Power Control - a key aspect to the NPRM process

- All modern communication systems use fast power control to limit interference
 - In the cellular space, fast power control is used by UMTS, CDMA and LTE but not by GSM
- Power control changes the mechanisms through which a Consumer Booster can de-sensitize the base station either through injecting noise into the base station or by overloading the signal into the base station
- Consumer Boosters designed for 3G and beyond cellular technologies that employ fast power control can provide higher quality service with no risk of harmful interference to carrier networks

Power Control - a key aspect to the NPRM process

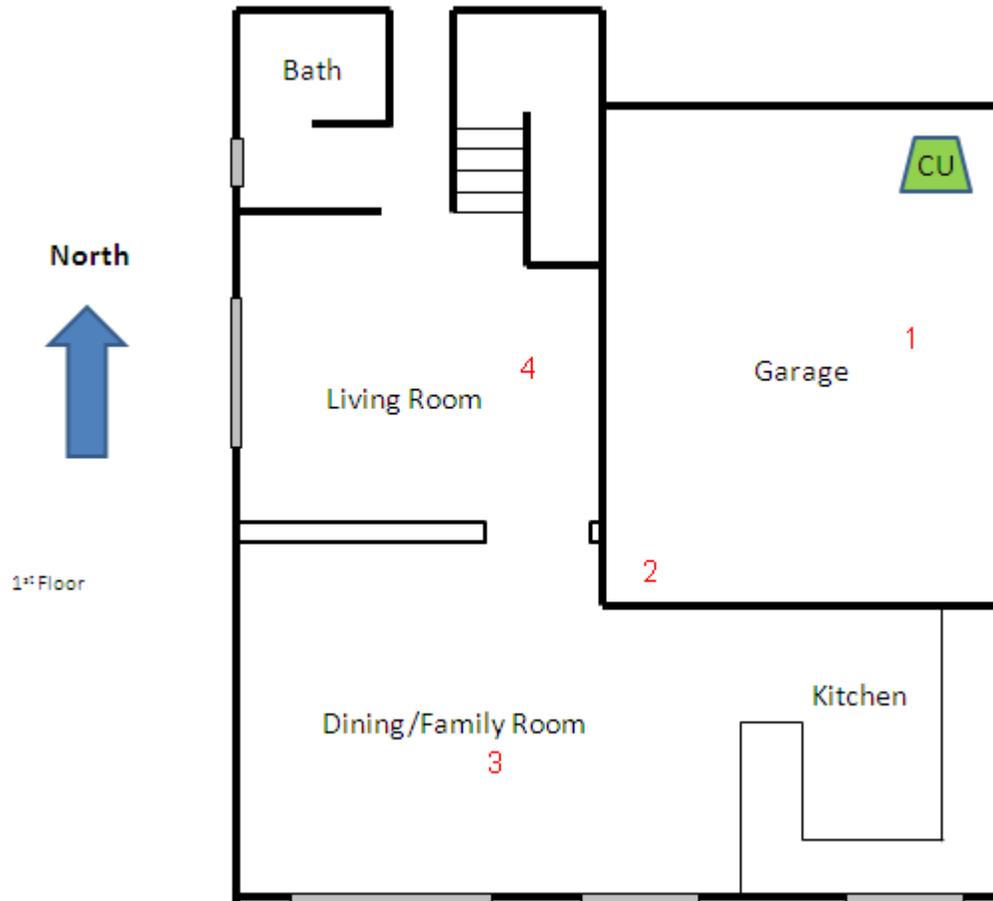
- Since power control is a fundamental characteristic of all 3G and beyond cellular standards, we support Commission Consumer Booster rules that are sufficiently flexible to take this fact into account.
- Allows widespread availability of well designed, Band Select (3G/4G specific) Consumer Boosters from a variety of responsible vendors, such as Nextivity,
 - Will allow for continued technology innovation
 - Meets the Commission's goal of improving wireless coverage to the benefit of consumers
 - Meet the Commission's goal of protecting carrier networks from harm.

Key NPRM Open Issues

Rule Subject	Key issue addressed	VZW/Wilson	NXT/TMUS
Maximum Booster Gain	Protect against signal overload at base station	$\text{Min}(-34\text{dB-RSSI} + \text{MSCL}, 6.5+20\log(\text{Freq}))$ For AWS $\approx 71\text{dB max}$ NEED TO ADDRESS ARTIFICIAL GAIN LIMIT WHICH REDUCES PRODUCT EFFECTIVENESS	$< \text{BSCL} - 28\text{dB OR}$ $< \text{RSSI} - 38\text{dB}$ for Power Controlled systems (3G onwards) <i>ELSE</i> VZW/Wilson proposal

Deployment of power control fundamentally impacts behavior of a repeater in the network. Base station automatically adjust handset Tx level to ensure the base station is not overloaded. Standard feature of all 3G and beyond systems and should be taken into account in NPRM

Influence of Booster Gain on Customer Experience



	G_{sys} 90dB	G_{sys} 71dB
	RSCP (dBm)	RSCP (dBm)
Location 1	-70	-91
Location 2	-81	-110
Location 3	-105	-120 (lost service)
Location 4	-99	-104

Current Cel-Fi performance

Reduced performance under VZW/Wilson proposal

Key NPRM Open Issues

Rule Subject	Key issue addressed	VZW/Wilson	NXT/TMUS
Noise limit	Protect base station against noise rise	<p>Min(-103dBm-RSSI, -102.5dBm+20log(Freq)) For AWS \approx -37dBm/MHz -Limit applies across entire spectrum block</p> <p>NEED TO ADDRESS BEHAVIOUR OF BAND SELECT BOOSTER</p>	<p><i>(In passband)</i> -109dBm/MHz + G_{sys} where $G_{sys} < BSCL-28dB$</p> <p>OR</p> <p>RSSI-38dB</p> <p><i>(Outside passband)</i> -103dBm-RSSI</p> <p>OR</p> <p>-102.5dBm+ 20log(Freq) if RSSI not available</p>

Key NPRM Open Issues

Rule Subject	Key issue addressed	VZW/Wilson	NXT/TMUS
OOBE	Protect system operating in adjacent spectrum blocks	FCC mobile limits – 6dB NEED TO ADDRESS UNNECESSARY COST IMPACT OF PROPOSAL	FCC mobile limits Interference in this area is dominated by MUCH larger population of handsets hence extra protection is not required

Proposed Alternative Rule Language

- Accepting the fact that band select, technology specific Consumer Boosters exist today and provide compelling value to consumers and operators, we propose the attached alternate rule language to create a framework within which companies can innovate and design new, high value products.
- We believe that the proposed rule language allows multiple products and design concepts to co-exist in the market providing consumer with the widest range of choice and while protecting carrier networks.

ATTACHMENT B

Proposed Rules based Verizon/Wilson proposal

(f) *Technical requirements.*

(i) *Noise Limits*

(A.i) For Consumer Boosters boosting any non base station power controlled signals, the transmitted noise power in dBm/MHz of consumer booster at their uplink port shall not exceed $-103 \text{ dBm/MHz} - \text{RSSI}$

Where RSSI is the downlink composite received signal in dBm measured over the pass band of the booster at the booster input port from the base station for each band of operation.

(A.ii) For Consumer Boosters boosting ONLY base station power controlled signals, the transmitted noise power in dBm/MHz at the Consumer Booster's uplink port shall not exceed EITHER

$-109 \text{ dBm/MHz} + G_{\text{sys}}$

Where $G_{\text{sys}} \leq \text{BSCL} - 28 \text{ dB}$

And BSCL is the actual measured coupling loss between the booster and the base station with signals in the passband of the Consumer Booster

OR

$-109 \text{ dBm/MHz} + G_{\text{sys}}$

Where $G_{\text{sys}} \leq \text{RSSI} - 38 \text{ dB}$

and RSSI is the downlink composite received signal in dBm measured over the pass band of the booster at the booster input port for each band of operation.

(B) The transmitted noise power in dBm/MHz of consumer boosters outside of the passband

Justification for proposed changes to Verizon/Wilson proposal

The noise limit proposed by Verizon is there to protect the noise floor at the base station.

A distinction is drawn between the behavior of power controlled systems such as CDMA, UMTS and LTE systems and non-power controlled systems such as GSM. In power controlled systems, the level of the wanted signal into the base station is controlled forcing the noise level of the signal from the booster to be below the base station noise floor, provided the Gain of the Consumer booster is low enough. In non-power controlled systems, the absolute noise level must be controlled as per the Verizon proposal .

Through simulation and our experience in more than 60 operator networks across the world, we have shown that setting the repeater gain to less than BSCL-28dB ensures sufficiently low gain to protect against any noise rise.

If the actual BSCL is not available in a consumer booster implementation, the RSSI can be used as a proxy, but the gain should be lowered to account for traffic loading effects.

of the Consumer Booster at their uplink and downlink ports shall not exceed the following limit:

-103 dBm/MHz – RSSI

where RSSI is the downlink composite received signal in dBm measured outside the pass band of the booster at the booster input port for each band of operation.

OR

-102.5dBm/MHz + 20 Log (Frequency)

Where Frequency is the uplink mid-band frequency of the supported spectrum band in MHz in the case where the RSSI outside the passband is not available.

This additional noise limit protects base stations operating in adjacent channels to the passband of the booster against any noise rise and uses the exact same formula proposed by Verizon to achieve this effect when the RSSI outside the normal passband can be measured, or

Falls back to the general limit proposed by the Verizon proposal in case the RSSI is not available.

(iii) *Booster Gain Limits*

(A.i) The uplink gain in dB of a consumer booster shall not exceed -34 dB – RSSI + MSCL

where RSSI is the downlink composite received signal in dBm at the booster input port from the base station for each band of operation

where MSCL (Mobile Station Coupling Loss) is the minimum coupling loss in dB between the wireless device and the input port of the consumer booster. MSCL must be calculated or measured for each band of operation and provided in compliance test reports.

OR

BSCL-28dB

Where BSCL (Base Station Coupling Loss) is the actual measured coupling loss between the booster and the base station for signals in the passband of the Consumer Booster.

This maximum gain formulation is guaranteed to protect against signal overload at the base station for power controlled systems. By 3GPP standard, the minimum output power of a handset is -56dBm / 5MHz. Assume a minimum Coupling loss between the handset and the booster of 40dB, this yields a signal level at the base station of

$$-56\text{dBm} - 40\text{dB} + G_{\text{sys}} - \text{BSCL}$$

$$= -56 - 40 + (\text{BSCL} - 28) - \text{BSCL}$$

= -134 dBm/5MHz which is far below the sensitivity specification of a base station. Hence this formulation provides no risk of signal overload at the base station.

(v) *Out of band emission limits.*

Consumer Booster out of band emissions (OOBE) shall be at least 6dB below the FCC's mobile emission limits for supported bands of operation. Compliance to OOBE limits will utilize high peak-to-average signal types.

Mobile Booster out of band emissions (OOBE) shall be at least 6dB below the FCC's mobile emissions limits for the supported bands of operation. Compliance to OOBE limits will utilize high peak-to-average signal types.

We propose to keep existing FCC rules for OOBE as this allows handset quality components to be utilized in the building of Consumer boosters with no risk to the network.

We propose to accept the Verizon proposal for Mobile Boosters as they offer a higher risk of interference to the network.